

REMARKS

Favorable consideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

After entry of the foregoing Amendment, Claims 17-42 are pending in the present Application. Claims 31-42 have been amended to address cosmetic matters of form. No new matter has been added.

By way of summary, the Official Action presents the following issues: Claim 41 stands objected to due to informalities; Claims 31, 32, and 35-42 stand rejected under 35 U.S.C. § 112, second paragraph, allegedly being indefinite; Claims 17-42 stand rejected under 35 U.S.C. § 103 as being unpatentable over Dabak et al. (U.S. Patent No. 6,728,302, hereinafter Dabak) in view of Greenstein et al. (U.S. Patent No. 6,131,016, hereinafter Greenstein).

INFORMATION DISCLOSURE STATEMENT

Applicants respectfully direct the Examiner's attention to the Information Disclosure Statement (IDS) filed July 3, 2001. Applicants note that this IDS has yet to be indicated as considered by the Examiner. As such, Applicants respectfully requests that the Examiner provide an initialed Form 1449 in the next communication.

OBJECTION TO CLAIM

The outstanding Official Action has objected to Claim 41. Applicants have amended Claim 41 to include the missing punctuation noted at page 2 of the Official Action.

Accordingly, Applicants respectfully request that the objection to Claim 41 be withdrawn.

REJECTION UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

The outstanding Official Action has rejected Claims 31, 32, and 35-42 under 35 U.S.C. § 112, second paragraph, allegedly being indefinite. Applicants have amended Claims 31-42 to correct cosmetic matters of form, including the antecedent basis issues outlined at pages 2-3 of the Official Action.

Accordingly, Applicants respectfully request that the rejection to Claims 31, 32, and 35-42 under 35 U.S.C. § 112, second paragraph, be withdrawn.

REJECTION UNDER 35 U.S.C. § 103

The outstanding Official Action has rejected Claims 17-42 under 35 U.S.C. § 103 as being unpatentable over Dabak in view of Greenstein. The Official Action cites Dabak as disclosing all of the Applicants' claimed features, with the exception of transmitting first and second data streams respectively, in an OFDM signal. However, the Official Action cites Greenstein as disclosing this more detailed aspect of the Applicants' claims, and, states that it would have been obvious to one of ordinary skill in the art to combine the cited references for arriving at the Applicants' claims. Applicants respectfully traverse the rejection.

By way of background, in signal carrier communication systems, phase comparison is typically done by comparison of pilot symbols. Orthogonal Frequency Division Multiplexing (OFDM) systems are known in which adaptive antenna arrays are utilized. In OFDM systems, the available frequency band used for communication is divided in a plurality of frequency subcarriers, whereby adjacent frequency subcarriers are respectively orthogonal to each other. In such systems, co-channel interference is present and is estimated based upon correlation of received signals at a receiver side.¹

¹ Application at pages 1-2.

In light of at least the above noted deficiencies in the art, the present advancements are provided. With at least the above object in mind, a brief comparison of the claimed advancements, in view of the cited references, is believed to be in order.

Applicants' Claim 17 recites, *inter alia*, a transmitting device for transmitting signals in a wireless orthogonal frequency division multiplex (OFDM) communication system with multiple transmission antenna, including:

. . . wherein said first and second pilot symbols correspond to one another and have the same frequency and time allocation and a regular distribution in the time and frequency dimension in the OFDM system,
and wherein pairs of first pilot symbols adjacent in the frequency dimension are respectively orthogonal to corresponding pairs of second pilot symbols and pairs of first pilot symbols adjacent in the time dimension are respectively orthogonal to the corresponding pairs of second pilot symbols.

Dabak describes a space-time transmission diversity scheme, in which pilot symbols are transmitted via first and second antenna. For example, as shown in Table 1, pilot symbols B1, S1, B2, and S2 are transmitted in every succeeding time slot through each of the antennas.² As noted in the Official Action at page 3, Dabak does not disclose transmitting first and second data streams, respectively, in an OFDM signal.

Greenstein describes a system for transmitting multi-carrier OFDM signals, including pilot tones. As shown in Fig. 2B, the downlink receiver, or terminal, performs differential phase detection of successive received pilot tones. In operation, the receiving terminal compares the strength of successive received pilot tones, and, determines which of the channels, that is the air channels associated with the respective transmit antenna, is currently

² Dabak at column 3.

carrying the stronger pilot tone. The terminal then sends this information back to the base station to select a corresponding transmission antenna.³

Conversely, in an exemplary embodiment of the Applicants' invention, a OFDM system is provided in which first and second pilot symbols correspond to one another and have the same frequency and time allocation and a regular distribution in time and frequency dimension in the OFDM system. Pairs of the first pilot symbols adjacent in the frequency dimension are respectively orthogonal to corresponding pairs of second pilot symbols and pairs of first pilot symbols adjacent in the time dimension or respectively orthogonal to the corresponding pairs of second pilot symbols. Neither Dabak nor Greenstein, alone or in combination, specify when and where in the OFDM system, specifically in relation to the time and frequency dimension, pilot tones are transmitted, as recited in Applicants' Claim 17 or any claim depending therefrom. Likewise, as independent Claims 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, and 41 recite substantially similar limitations to that discussed above, Applicants submit that these independent claims, and any claims depending therefrom, are likewise allowable over the cited combination of references.

Accordingly, Applicants respectfully request that the rejection of Claims 17-42 under 35 U.S.C. § 103 be withdrawn.

³ Greenstein at column 4, lines 53-63.

CONCLUSION

Consequently, in view of the foregoing amendment and remarks, it is respectfully submitted that the present Application, including Claims 17-42, is patently distinguished over the prior art, in condition for allowance, and such action is respectfully requested at an early date.

Respectfully submitted,

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